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ABSTRACT

A study assessed the need for technology programs in the Bedford and Bloomington areas of Indiana. After compiling such background data as population projections for the cities, the educational level of adults living in the region, and the number and size of firms located in the area, the researchers formulated projected requirements for engineering technicians, computer programmers, supervisors, and quality control specialists in the area. Next, these projections were corroborated through interviews with representatives of local industries and appropriate agencies and by comparing the local projections with national employment projections for the same occupations. As a result of an analysis of these data the following actions were recommended: authorization to implement an electrical engineering technology associate degree program, authorization to implement a supervision technology associate degree program provision of related adult continuing education and service courses, development and implementation of computer technology and quality control specialist programs, formation of technology advisory committees, and expansion of existing efforts in the areas of liaison and coordination. (MN)

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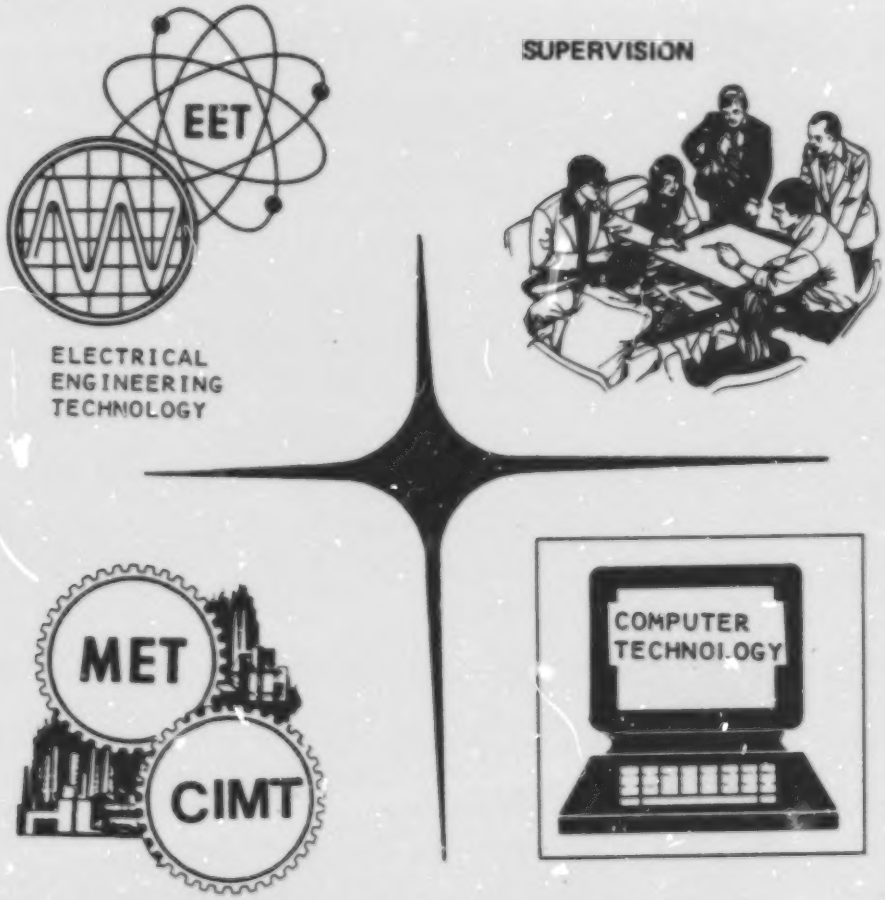
A MANPOWER STUDY
ASSESSING THE NEEDS FOR
PURDUE TECHNOLOGY PROGRAMS
IN THE BEDFORD/BLOOMINGTON INDIANA AREA
AND REGION 10



MANPOWER REPORT 84-8

30 SEPTEMBER, 1984

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TABLE OF CONTENTS

ASSESSING THE NEEDS FOR TECHNOLOGY PROGRAMS IN THE BLOOMINGTON-BEDFORD, INDIANA AREA (REGION 10)

Section	Title	Page
1	PURPOSE OF THE REPORT	1
2	BACKGROUND	1
	A. Demographics: Region 10	1
	Table 1. Population Projections for Indiana and Region 10	1
	Table 2. Population of Key Cities in Region 10	2
	Table 3. Monroe and Lawrence Counties Population Age Structure: 1980-2000	2
	Map 1. Working Patterns Surrounding Monroe County	3
	B. Educational Level of Adults	4
	Table 4. Educational Attainment Comparisons: the Nation, Indiana and Region 10	4
	C. The Workforce in Region 10 and Monroe and Lawrence Counties	5
	Table 5. Employment and Number and Size of Firms in Region 10 and in Monroe and Lawrence Counties	7
3	METHODOLOGY OF COMPUTING TECHNICAL MANPOWER AND PROGRAM NEEDS	8
	A. Manpower Needs	8
	B. Program Considerations	9
	C. Review and Corroboration	9
4	ANNUAL RECURRING REQUIREMENTS FOR SUPERVISORS, ENGINEERING TECHNICIANS, AND COMPUTER PROGRAMMERS IN REGION 10 AND MONROE COUNTY	9
	Table 6. Annual Recurring Requirements for Trained Technicians in Region 10 and Monroe County within Manufacturing, Service and all other Industries	11
	Table 7. Calculated Annual Requirements for Computer Integrated Manufacturing Technicians	12
5	EDUCATIONAL ACCREDITATION	13
	A. Regional and Professional Accrediting Bodies	13
	B. Accreditation of Engineering and Technology Programs	13
	C. Purdue University Engineering Technology Programs	13
6	EMPLOYMENT PROJECTIONS FOR ELECTRICAL AND ELECTRONICS TECHNICIANS AND COMPUTER SPECIALISTS THROUGH 1995 (NATIONAL)	14
	Table 8. Occupational Employment Projections for Electrical/Electronics Technicians and Computer Specialists Through 1995 (National)	14

TABLE OF CONTENTS (CONTINUED)

Section	Title	Page
7	EMPLOYMENT PROJECTIONS FOR SUPERVISORS THROUGH 1995 (NATIONAL)	14
	Table 9. Occupational Employment Projections for Supervisors to 1995 (National)	14
8	QUALITY CONTROL (Q.C.) SPECIALISTS	15
	A. Descriptions	15
	B Needs for Q.C. Specialists	15
	C. Instructional Programs for Q.C. Specialists	15
9	THE INDIANA COMMISSION FOR HIGHER EDUCATION STUDY OF POST-HIGH SCHOOL EDUCATIONAL NEEDS AND OPPORTUNITIES IN SOUTHERN INDIANA	16
10	LOCAL LETTERS OF SUPPORT	18
11	CONCLUSIONS AND RECOMMENDATIONS (on canary paper)	19
	A. Summary and Conclusions	19
	1. Population	19
	2. Educational Attainment	19
	3. Choice of Attending Postsecondary Institution	20
	4. Work Force in Region 10	17
	Table 10. Employment Highlights for Region 10 in Selected Industries, and Monroe and Lawrence Counties	21
	5. Technical and Supervision Training Requirements	21
	a. Electrical & Electronics Engineering Technicians	22
	b. Supervisors	22
	c. Computer Programmer/Analysts	22
	d. Computer Integrated Manufacturing Technology/ Mechanical Engineering Technology	22
	6. Accreditation of Engineering Technology Program	23
	7. Quality Control (Q.C.) Specialists	23
	8. Adult Continuing Education	24
	9. Local Advisory Committee	24
	10. The Indiana Commission for Higher Education Report	25
	*****	
	B. Recommendations	26
	1. Authorization to Implement the Electrical Engineering Technology (EET) Associate Degree Program	26
	2. Authorization to Implement the Supervision Associate Degree Program	26
	3. Computer Technology Program Implementation	26
	4. Follow-on Programs	27

TABLE OF CONTENTS (CONTINUED)

Section	Title	Page
5.	Quality Control Specialists	27
6.	Adult Continuing Education and Service Courses	27
7.	Indiana Commission for Higher Education Report Statements	28
8.	Technology Advisory Committees	28
9.	Liaison and Coordination	29

ATTACHMENTS

I.	Description of Two Year Associate in Applied Science (AAS) Degree Program in Electrical Engineering Technology	30
II.	Description of Two Year Associate in Applied Science (AAS) Degree Program in Supervision	31
III.	Description of Two Year Associate in Applied Science (AAS) Degree in Computer Technology	33

APPENDICES

I	Letters of Endorsement or Support	34

NEEDS FOR TECHNOLOGY TYPE PROGRAMS IN THE BLOOMINGTON-BEDFORD, INDIANA AREA (REGION 10)

1. PURPOSE OF THIS REPORT

This manpower report is designed to determine the associate degree (two-year) Technology-type programs needed in Monroe and Lawrence Counties (Region 10).

The foundation for justifying a given technology program in a certain locale includes the documentation of annual recurring requirements for its graduates (new hirees), as well as for upgrading or retraining adults now in the work force. When these requirements are corroborated as being substantial by representatives from local industries and organizations, there is reason to proceed with studying other considerations, such as the numbers of qualified students who might attend, support of the local community, availability of resources, etc.

This report should assist administrators and other decision makers as to what should be done in order to meet the demand for newly trained technician-level personnel and to upgrade or retrain adults in the work force in Monroe and Lawrence Counties (Region 10).

2. BACKGROUND

A. Demographics: Region 10

The 1980 population of the four counties making up Economic Region 10 was 187,600. It is projected to increase to 209,200 by the year 2000 (an increase of 11.5%) This region's increase compares with a projected increase of 6.7% for the population of Indiana during the same period.

TABLE 1

POPULATION PROJECTIONS
INDIANA AND REGION 10

Place	Population 1980	Population 2000	% Change
INDIANA	**5,490,200**	**5,885,500**	**+ 6.7%**
Region 10	187,600	209,200	+11.5%
Greene County	30,400	33,700	+10.9%
Lawrence County	42,500	46,300	+ 8.9%
Monroe County	98,800	108,600	+ 9.9%
Owen County	15,900	20,600	+29.6%

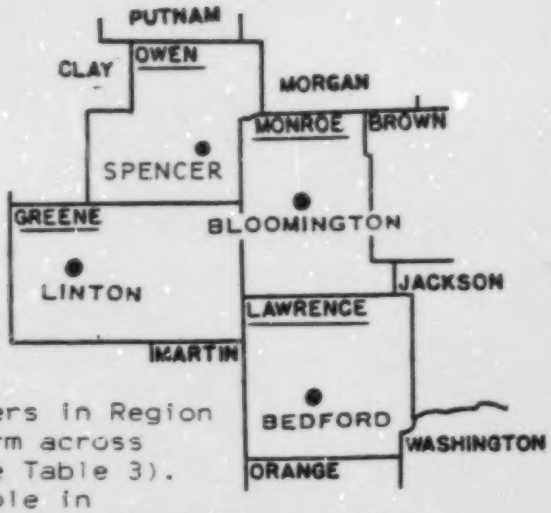
Source: Indiana University, Division of Research, School of Business-- and the Indiana State Board of Health.

The largest cities in Region 10 are Bloomington in Monroe County and Bedford in Lawrence County. The population of key cities in this region are shown in Table 2.

TABLE 2

POPULATION OF KEY CITIES IN REGION 10

County	City	1980 Population
Greene	Linton	6,315
Lawrence	Bedford	14,410
Monroe	Bloomington	51,646
Owen	Spencer	2,732



Of significance to educational planners in Region 10, the population structure is not uniform across counties for the different age groups (see Table 3). For Monroe County, there will be more people in the age groups 14 years of age or younger, opposite the trend for the other three counties, especially Lawrence County. For all four counties, there will be fewer people 15 to 19 years of age. Again opposite the other three counties, Monroe County will experience an increase in the number of young adults 20 to 24 years of age but not the major increase that will occur for the other three counties of those persons in the middle working years, 35 to 49 years. All four counties will experience a major increase in the number of persons age 65 or older (about 7130 more for Region 10 as a whole).

TABLE 3

REGION 10 AND MONROE AND LAWRENCE COUNTIES* POPULATION AGE STRUCTURE: 1980-2000

Age Groups	1980 Population			2000 Population			Number Change in Population			Percent Change in Population		
	Region 10	Monroe	Lawrence	Region 10	Monroe	Lawrence	Region 10	Monroe	Lawrence	Region 10	Monroe	Lawrence
0- 4	11870	5570	3050	13910	7480	2910	+ 2040	+1910	- 140	+17.2%	+34.3%	- 4.6%
5- 9	12440	5460	3470	14110	7570	2970	+ 1670	+2110	- 500	+13.4%	+38.6%	-14.4%
10-14	13200	5800	3590	13250	6670	3000	+ 50	+ 870	- 590	+ 0.4%	+15.0%	-16.4%
15-19	21040	13340	3630	16140	9700	2960	- 4900	-3640	- 670	-23.3%	-27.3%	-18.5%
20-24	26950	20610	3180	29970	23540	2980	- 3020	+2930	- 200	+11.2%	+14.2%	- 6.3%
25-34	30980	17820	6490	32660	18460	6710	+ 1680	+ 640	+ 220	+ 5.4%	+ 3.6%	+ 3.4%
35-49	27600	13010	7010	34490	12920	9970	+ 6890	- 90	+2960	+25.0%	- 0.7%	+42.2%
50-64	23860	10050	6620	27780	10930	7750	+ 3920	+ 880	+1130	+16.4%	+ 8.8%	+17.1%
65+	19660	7150	5460	26790	11280	7030	+ 7130	+4130	+1570	+36.3%	+57.8%	+28.8%
TOTALS	187600	98800	42500	209200	108600	46300	+21600	+9800	+3800	+11.5%	+ 9.9%	+ 8.9%

*For further details see "Indiana and Region 10 Counties' Population Projections to the Year 2000, by Age and Sex, and Adult Education Attainment Levels." 10 November, 1983, Office of Manpower Studies, Purdue University, West Lafayette, Indiana 47907.

Also, of significance is the fact that Monroe County is a major work center for people in surrounding counties. More than 4,100 people who do not live in Monroe County work there, whereas only about 1,500 Monroe County residents work outside of their home county; a net gain of some 2,600 workers. See map and summary of working patterns on next page.

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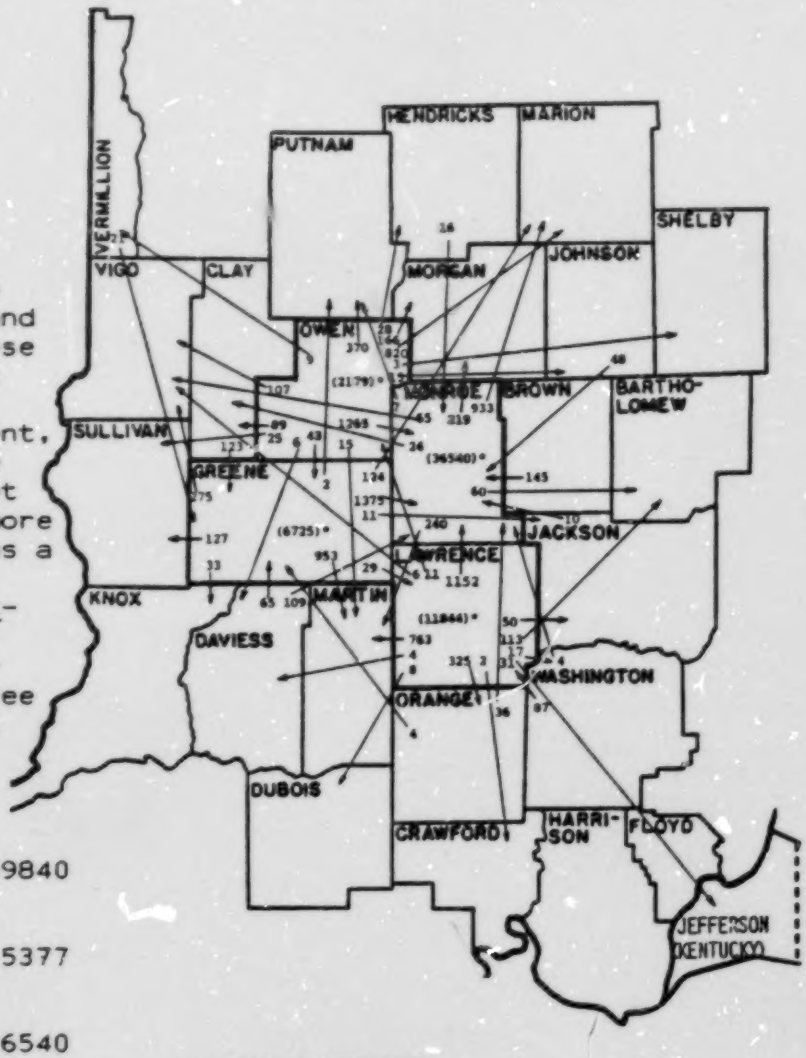
MAP 1

REGION 10
WORKING PATTERNS - 1980

According to the 1980 Census, almost 60,000 adults (16 years and older) lived and worked in Region 10. Of these resident workers, 61 percent lived and worked in Monroe County, and another 20 percent, in Lawrence County.. Monroe County also experienced a net in-migration of workers of more than 2600, while Region 10 as a whole and the other three counties experienced net out-migration. Finally, Monroe County experienced a net in-migration from the other three Region 10 counties of almost 3800.



REGION 10

Living & Working.....59840
Migration In... 668
Migration Out..6045
Net Migration (Out)..... 5377

MONROE COUNTY
Living & Working.....36540
Migration In.....4160
IntraRegion (3792)
InterRegion (368)
Migration Out.....1548
InterRegion (1548)
Net Migration (In)..... 2612

GREENE COUNTY
Living & Working..... 6725
Migration In.....261
IntraRegion (48)
InterRegion (213)
Migration Out..... 2929
IntraRegion (1404)
InterRegion (1525)
Net Migration (Out)..... 2668

LAWRENCE COUNTY
Living & Working.....11844
Migration In.....116
IntraRegion (29)
InterRegion (87)
Migration Out.....2482
IntraRegion (1163)
InterRegion (1319)
Net Migration (Out)..... 2366

OWEN COUNTY
Living & Working..... 2179
Migration In.....11
IntraRegion (11)
Migration Out.....2966
IntraRegion (1313)
InterRegion (1653)
Net Migration (Out)..... 2955

*Workers 16 years and over living in the county.
SOURCE: Census of Population and Housing, 1980: Supplement 1--Tabulation PB34, Place of Work, Washington, D.C.: Bureau of the Census, 1983.

B. Educational Level of Adults

The educational attainment levels of adults in Region 10 in general are below State averages, the exception being Monroe County, home of Indiana University. The proportion of adults who have had no high school is greater than the State average; the proportions of adults who have a high school diploma or equivalent or have 1 to 3 years of college are smaller than the State averages. The one bright spot is Monroe County's higher proportion of adults with a bachelor's or higher level college degree. (Indiana University is located in Monroe County.) The other three counties are very low in educational level. It should also be noted that the proportion of adults with some college but no bachelor's degree is well below State and National averages. (Indiana's overall educational levels are below the Midwestern Region and National averages.) Unfortunately, evidence indicates that lower educational levels are related to lower wages or salaries, higher unemployment, and slower career progression. See Table 4 for educational level comparisons. Also, the results of previous surveys bearing on educational attainments are shown on the next page.

TABLE 4

EDUCATIONAL ATTAINMENT COMPARISONS
ADULTS 25 YEARS AND OLDER (% DISTRIBUTION)
THE U.S., INDIANA AND REGION 10

	Highest Educational Level Attained						
	Elementary	High School		College			Σ Adult
	0-8	1-3	4	1-3	≥4	Totals	Population
United States	18.4%	15.3%	34.4%	15.7%	16.3%	100%	132,775,652
Indiana	16.6%	17.1%	41.7%	12.1%	12.5%	100%	3,135,772
Region 10	17.1%	17.0%	36.8%	10.7%	18.4%	100%	102,049
Greene	22.0	19.2	43.0	8.4	7.3	100%	18,982
Lawrence	21.5	20.7	43.8	7.3	6.7	100%	25,555
Monroe	11.8	13.4	29.8	13.7	31.3	100%	48,024
Owen	21.7	21.0	41.3	9.0	7.0	100%	9,488

Source: 1980 Census Data.

Previous Survey Results:*

WHY PEOPLE CHOOSE A PARTICULAR COLLEGE
(THE MOST IMPORTANT REASON GIVEN)

RANK ORDER		PERCENT OF RESPONDENTS
1	Offers what I want to study	35.3%
2	Location is near home	21.4
3	Good academic reputation	14.6
4	Low tuition	5.7
5+	All other reasons	23.0
		100.0%

*Source: Office of Manpower Studies, Purdue University, West Lafayette, Indiana 47907.

REASONS WHY MORE
HOOSIERS SHOULD CONTINUE THEIR EDUCATION*

The higher one's educational level:

1. The lower the unemployment rate
2. The higher the salary/wage
3. The better the career progression
4. The easier to retrain or upgrade
5. The better the chance to take advantage of opportunities

Also, there are intrinsic benefits: e.g., enhance ability to appreciate, maturation of value structure, increase in expressive skills, intellectual development, raise self-confidence, and others.

*Source: "The State of the Economy and the State of Education in the State of Indiana." 1 November 1983. Office of Manpower Studies, Purdue University, West Lafayette, Indiana 47907.

C. The Workforce in Region 10 and Monroe and Lawrence Counties

Monroe County is the largest of the four counties in Economic Region 10. This geographic regional area is not particularly useful in determining technical education needs for Monroe County, inasmuch as Monroe County is not centrally located. Employment in Region 10 is highly concentrated in Monroe County--and secondarily in Lawrence County. See Table 5 for employment data.

There were more than 54,000 employees in Region 10 working in about 3,100 firms covered by the Indiana Employment Security Division (4th quarter 1983). The largest employment was in the Services Division (e.g., personal business, health, education, social services, and related organizations). Almost 19,000 workers--35 percent of all workers in the region--worked in Services: about 10,300 and 3,500 of these workers were in Monroe and Lawrence Counties, respectively. The second largest employment group was the Manufacturing Division, with almost

13,000 workers or 24 percent of all workers in the region. About 8,000 of these workers were in Monroe County, and 4,000 in Lawrence County. The largest manufacturing firm is RCA/Consumer Electronics located in Bloomington. Finally, the last major division of employment was in Retail Trade, with about 11,400 workers, of which more than 6,000 were in Monroe County and 2,000 in Lawrence County. Altogether, Monroe County accounts for about 56.2 percent of Region 10 employment, and Lawrence County, another 21.3 percent--a total of 77.5 percent of the Region's employment. See Table 5 for details.

TABLE 5

EMPLOYMENT IN REGION 10 AND IN MONROE AND LAWRENCE COUNTIES BY INDUSTRIAL DIVISIONS AND LARGER MAJOR GROUPS* (4TH QUARTER, 1983)

Industrial Division and Major Groups	S.I.C.** Codes(s)	Region 10 Employees Number	Region 10 Employees Percent	Region 10 Firms Number	Region 10 Firms Percent	Calculated Monroe County Employment	Calculated Lawrence County Employment
Agriculture	01-09	212	.4%	42	1.3%	115	39
Mining	10-14	636	1.2%	37	1.2%	346	117
Construction	15-17	1605	3.0%	296	9.4%	873	296
Manufacturing	20-39	12848	23.7%	203	6.4%	7979	3931
Food Products	(20)	(538)		(14)		(342)	(59)
Printing & Publishing	(27)	(589)		(35)		(232)	(43)
Stone,Clay,Glass & Concrete Products	(32)	(689)		(33)		(389)	(287)
Primary Metal Industries	(33)	(1176)		(4)		(62)	(1114)
Machinery	(35)	(1225)		(18)		(842)	(383)
Electrical & Electronic Machinery	(36)	(5737)		(12)		(5335)	(34)
Transportation Equipment	(37)	(881)		(5)		(6)	(875)
Instrumentation	(38)	(640)		(6)		(640)	--
Transportation, Communication, & Utilities	40-49	2481	4.6%	129	4.1%	1349	457
Motor Freight Transportation	(42)	(810)		(80)		(441)	(149)
Communications	(48)	(756)		(18)		(411)	(139)
Wholesale Trade	50,51	1479	2.7%	167	5.3%	804	272
Nondurable Goods	(51)	(998)		(81)		(543)	(184)
Retail Trade	52-59	11440	21.1%	965	30.6%	6222	2107
General Merchandizing	(53)	(1651)		(59)		(898)	(304)
Food Stores	(54)	(1861)		(82)		(1012)	(343)
Auto Dealers & Gas Service Stations	(55)	(1096)		(174)		(596)	(202)
Restaurants & Bars	(58)	(4172)		(231)		(2269)	(769)
Finance, Insurance, Real Estate	60-67	1958	3.6%	230	7.3%	1065	361
Banking	(60)	(801)		(14)		(436)	(148)
Services	70-89	18958	34.9%	929	29.4%	10311	3492
Hotels & Lodging	(70)	(585)		(66)		(318)	(108)
Business Services	(73)	(743)		(109)		(404)	(137)
Health Services	(80)	(4590)		(248)		(2496)	(846)
Educational Services	(82)	(10475)		(27)		(5697)	(1930)
Social Services	(83)	(543)		(32)		(295)	(100)
Public Administration	91-93	2706	5.0%	157	5.0%	1472	498
Local	(93)	(1844)		(63)		(1003)	(340)
State	(92)	(692)		(77)		(376)	(127)
TOTAL ALL DIVISIONS		54323	100.0%	3155	100.0%	30536	11570

*IESD Data: Includes only employment covered by Indiana Employment Security Division.

**Standard Industrial Classification. Executive Office of the President, Office of Management and Budget.

3. METHODOLOGY OF COMPUTING TECHNICAL MANPOWER AND PROGRAM NEEDS

A. Manpower Needs

The techniques applied involve the following steps: First, a determination must be made, by Standard Industrial Classification Code (SIC) of all of the various manufacturing and service firms which previous studies have indicated employ persons trained in technical programs. The second step is to make a listing of all the firms by SIC Code and size of employment in the region that were identified in Step 1. The number of employees in each of these SIC manufacturing groups in Region 10 and in Monroe and Lawrence Counties are presented in Table 5 on the preceding page.

Third, a determination is made of the proportion of employees in these firms that are employed in occupations with skills and qualifications applicable to technology-type training programs. These occupational distribution factors come from a National manpower study made by the U. S. Department of Labor which identified every occupation normally found in each type (classification) of industry. The study results are reported in the OES*. The OES report presents the percentage of people in each occupation normally found within each type of industry. For example, a certain percent of a given type of manufacturing firm's employees are made up of specific types of engineers, technicians, clerks, draftsmen, tool and die makers, machinists, etc. By applying these employee percentage factors for each pertinent occupation that are related to technology programs, one can compute the numbers and types of technicians normally employed in each industry. After the proportional number of each type of occupation under study that is employed is determined, the next step is to apply the normal attrition and turnover rates from that occupation, as well as the anticipated growth in order to calculate the annual recurring requirements for new personnel. Adjustments are made according to recommendations of labor analysts in the State Research and Statistics Office, Indiana Employment Security Division, and previous studies.

The fifth step is to determine the requirement for upgrading and retraining adults now in the workforce must be determined. These are critical data because educational programs are justified not only on the basis that there probably are adequate job opportunities for graduates, but also that a need exists for continuing education for adults, both now and in the future. Finally, the results of the preceding steps are verified through surveys, and/or meetings and consultation with appropriate representatives in pertinent industries.

The next section of this report presents the annual recurring requirements for technical personnel for Region 10 and Monroe County for which technology types of training programs are indicated.

Occupational Employment Statistics. Staffing Patterns in the Manufacturing Industries in Indiana: 1977 as Updated. Research and Statistics and U.S. Department of Labor, February 1980.

B. Program Considerations

After the technical manpower requirements for a county have been calculated, as well as for the economic region in which it is located, it is necessary to review what related programs are being planned or offered within reasonable distances.

C. Review and Corroboration

It is of benefit to involve representatives from local industries and members of appropriate agencies in the review of data, conclusions and recommendations. Letters of support and concurrence are valuable additions to the study. In this regard, the general summary, conclusions and recommendations presented in this report are endorsed by and supported by representatives from key industries. *(See Appendices to this report.)*

4. ANNUAL RECURRING REQUIREMENTS FOR SUPERVISORS, ENGINEERING TECHNICIANS, AND COMPUTER PROGRAMMERS IN REGION 10 AND MONROE COUNTY

As reported in Section 2C and Table 5, employment data indicate that there are more than 54,000 employees in the Region 10 workforce. About 8,000 are employees who work in manufacturing firms, and 22,500 more work in pertinent service and other industries in Monroe County. Applying the methodology described earlier, the computed annual recurring requirements for technicians in Region 10 and for Monroe County are shown in Tables 6 and 7.

Data indicate that a priority technician manpower need is for electrical and electronic engineering technicians. The computed annual requirements (based on employment covered by the Indiana Employment Security Division) indicate 24 technicians are needed as new entrants into the labor force, plus a requirement to upgrade and/or retrain 19 electronics technicians now in the workforce in Region 10. When these requirements are expanded to all firms in the region the annual requirement becomes 25 new technicians and a need to upgrade or retrain 20 technicians. (Of these expanded numbers, needs in Monroe County account for 20 new technicians and 16 to be retrained or upgraded.) RCA in Bloomington is the largest firm in this industry group. *See Attachment 1 for a description of the two-year electrical engineering technology program.*

The largest numerical need may be for Supervisors in all types of service and manufacturing industries in order to meet growth, replacement, and turnover needs in Region 10. The computed requirement shows that approximately 51 new supervisors are needed annually (e.g., "first-line" supervisors, foremen, office or small business administrators, etc.). This number is augmented by a requirement each year to update or retrain approximately 47 adults now in the workforce (mostly current supervisors). When the coefficient of expansion is applied (estimated increase reflecting employment not covered by the Indiana Employment Security Division), up to a total of 54 new supervisors may be needed each year, plus about 50 more who might need upgrade or retraining. Of this total to

train about 100 supervisors each year, about 65 are in Monroe County. Of course, some of these requirements for new supervisors will be met by new-hirees or current employees (who are not now supervisors) who have an adequate and applicable educational base. However, previous research shows that fully qualified persons make up the smaller proportion of total needs for new first-line supervisors. See Attachment 2 for a description of the two-year supervision program.

Finally, data indicate there are emerging needs for two additional technology programs in Region 10. They are (1) Computer Technology (business programmer/analyst) and (2) Computer Integrated Manufacturing Technology (CIMT).

A calculated (expanded total) need exists in Region 10 for approximately 16 new business programmer/analysts to be added to the workforce each year, plus a requirement to upgrade or retrain approximately 17 more. About two-thirds of these annual needs for 33 business programmer/analysts are in Monroe County. *(See Table 6 for requirements data and Attachment III for associate degree computer technology program description.)*

The need for CIMT can be calculated as a partial ratio of the requirements for mechanical engineering technicians, industrial engineering technicians, and draftsmen & tool programmers (numerical control). Data indicate a current annual requirement and retraining and upgrade training need of 13 CIMT technicians. (See Table 7.) *It would be essential for a local industrial advisory committee to be organized to help define and plan for such a program to meet regional needs.*

NOTE: The closest universities to Bloomington which offer technical-type programs include Indiana State University and Rose Hulman Institute located in Terre Haute (more than 60 road miles to the West-Northwest); and Vincennes University located in Vincennes, more than 70 miles to the Southwest. Approximately 30 road miles separate Bloomington and Bedford [connected by an excellent road (SR 37)].

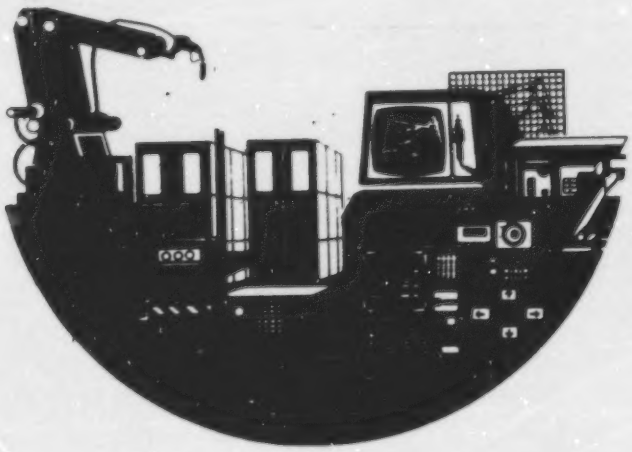


TABLE 6

ANNUAL RECURRING REQUIREMENTS FOR TRAINED TECHNICIANS IN REGION 10 AND MONROE COUNTY WITHIN MANUFACTURING, SERVICE AND ALL OTHER INDUSTRIES

REGION 10

Occupation	Technical Employment[1] 4th Q. 1982	Technical Employment[1] Proj. 1985	Annual Recurring Needs for New Labor Force Entrants* Expansion[2]	Repl.[3]	Turnover[4]	Base Total	Exp. to Univ.[5]	Retraining & Updating Base Total[6]	Retraining & Updating Exp. to Univ.[5]	Expanded Grand Total
Electrical/Electronic Engr. Technicians.....	167	194	9	6	9	24	25	19	20	45
Mechanical Engineering Technicians.....	53	62	3	3	3	9	9	6	6	15
Industrial Engineering Technicians.....	13	16	1	1	1	3	3	1	1	4
"Other" Engineering Technicians.....	54	63	3	3	3	9	9	6	6	15
Computer Programmers....	141	151	3	4	8	15	16	16	17	33
Supervisors[7]	408	457	16	13	22	51	54	47	49	103
Draftsmen & Tool Programmers(Numerical Control)[8]	127	138	4	5	7	16	17	14	15	32

MONROE COUNTY

Electrical/Electronic Engr. Technicians	133	154	7	4	8	19	20	15	16	36
Mechanical Engr. Tech.	40	48	3	2	2	7	7	5	5	12
Industrial Engr. Tech.	9	11	1	--	1	2	2	1	1	3
"Other" Engr. Technicians	36	39	1	2	2	5	5	4	4	9
Computer Programmers	91	97	2	3	5	10	10	10	11	21
Supervisors	253	284	10	8	14	32	34	29	31	65
Draftsmen & Tool Programmers (Numerical Control)	91	99	3	4	5	12	13	10	11	24

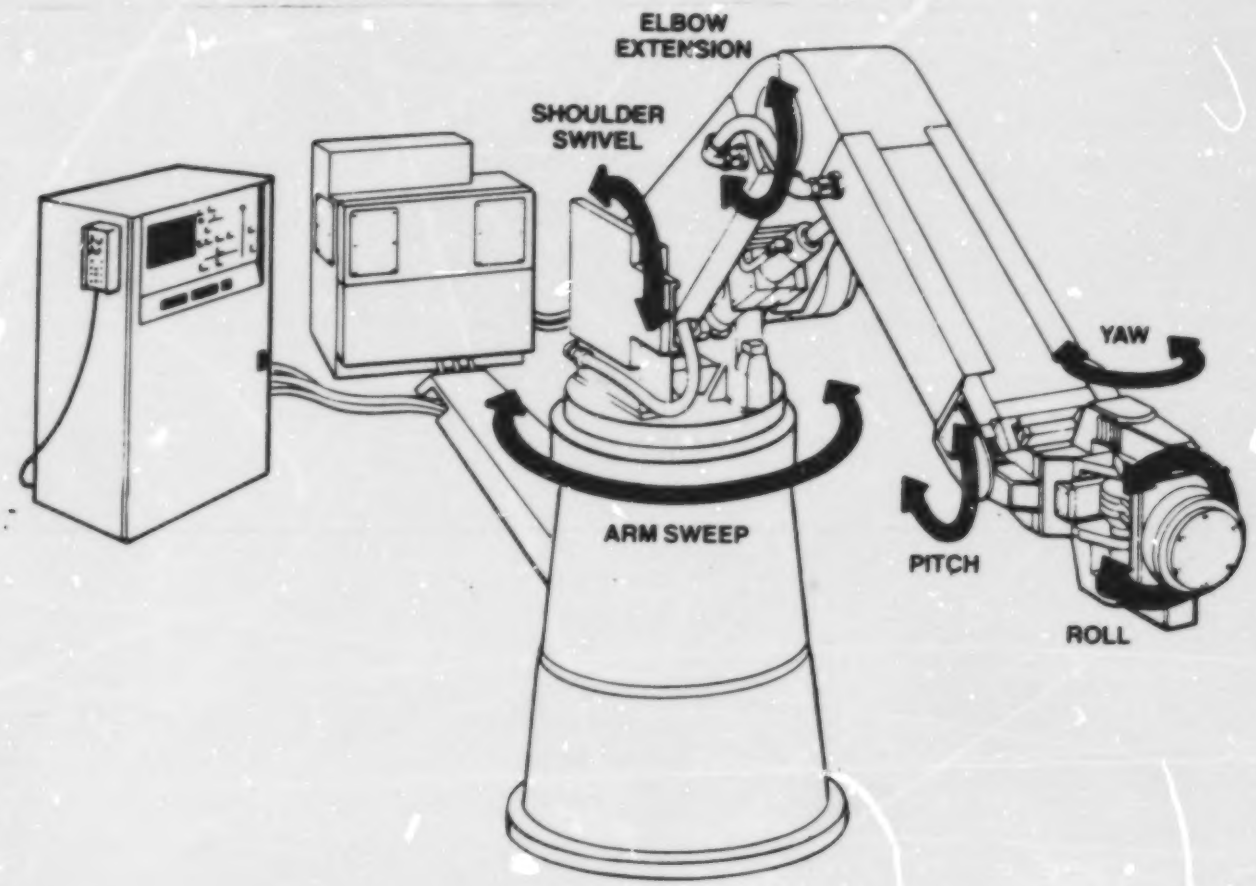
1/ Indiana Employment Security Division (IESD) data.
2/ IESD data: one-third 1985-1982 employment difference.
3/ Retirements and deaths (generally 3-5%: three times IESD percentage).
4/ Based on estimated 5% (5.25% with compounding) loss annually of total number employed due to job turnover.
5/ Data expanded to the universe (coefficient of expansion = 1.053) because IESD data represents only approximately 95% of total employment.
6/ Based on estimated 10% (11.03% with compounding) annual need for technological updating and retraining.
7/ Based on 3.3% (1 supervisor to 29 workers) of total manufacturing work force.
8/ Holders of an associate degree in drafting and those trained in the use of computer-aided drafting systems and electronic drafting equipment have the best career prospects. There will be a lessening demand for tracers and junior drafters.

*Some new hirees, or persons promoted to first-line supervision, may already possess many of the required skills and qualifications. They may desire to enroll only in selected courses.

TABLE 7

CALCULATED ANNUAL REQUIREMENTS FOR
COMPUTER INTEGRATED MANUFACTURING TECHNICIANS
(Based on Expanded Grand Total Technician Requirements in Table 6)

Occupation	Expanded Grand Total	Ratio of* CIMT'S to Other Technicians	Calculated CIMT Tech. Requirements
Industrial Engineering Technician.....	4	1 in 3	1
Mechanical Engineering Technician.....	15	1 in 3	5
"Other" Engineering Technicians.....	15	1 in 5	3
Draftsmen & Tool Programmers (Numerical Control)	32	1 in 8	4
TOTALS	66		13



5. EDUCATIONAL ACCREDITATION*

A. "Regional" and Professional Accrediting Bodies

Good engineering and engineering technology programs have marks of excellence. Accreditation is such a mark. Many students go through their collegiate years without giving much thought to accreditation. Many employers and parents, however, investigate the accreditation status of colleges and curricula.

There are two generally accepted forms of educational accreditation in the United States that are independent of required state and federal accreditations. One of these forms is "regional accreditation," which accredits institutions rather than curricula, disciplines or programs. Thus, regional accreditation is a wide brush touching all phases of operation and branches of an institution. Traditionally, detailed examination of programs and curricula are left to the second kind of accrediting agency, the professional accrediting body.

Most professions have an associated professional accrediting body. Professional accrediting bodies typically involve extensive and in-depth peer review of curricula and programs within a certain body of knowledge. There is little contact among accrediting bodies because of their specialized nature.

B. Accreditation of Engineering and Technology Programs

ABET is the Accreditation Board for Engineering and Technology. It is responsible for the accreditation of engineering and engineering technology degree programs in colleges and universities in the United States. The U. S. Department of Education and the Council on Postsecondary Accreditation (COPA) recognize ABET as the sole accrediting agency for engineering and engineering technology.

ABET is completely autonomous. It is financially independent to protect and assure objectivity in its evaluation of curricula and other activities. It maintains a cooperative relationship with several engineering groups, including the American Association of Engineering Societies.

Two commissions of ABET--the Engineering Accreditation Commission (EAC) and the Technology Accreditation Commission (TAC)--evaluate the appropriate curricula and are responsible for the decisions on accreditation. The ABET board of directors sets criteria, policy and procedures based on recommendations from the commissions and decides appeal cases.

C. Purdue University Engineering Technology Programs

It is the goal of the School of Technology for all engineering technology programs (both associate and bachelor's degrees in all fields) to achieve and maintain ABET accreditation. With the exception of newly established programs, this goal has been achieved.

**Source: ENGINEERING EDUCATION: May 1983, "Engineering Technology Comments--ABET--A Good Bet," Dr. Ron Williams, Del Mar College, page 770.*

6. EMPLOYMENT PROJECTIONS FOR SUPERVISORS THROUGH 1995 (NATIONAL)

The Bureau of Labor Statistics (BLS) has recently published their occupational projections to 1995. In the BLS report* it was stated: "Employment in supervisory jobs requiring a college education or specialized post-secondary technical training [illegible] expected to increase significantly."

Pertinent to this report are data in the BLS report which show that the total employment in all occupations is expected to grow about 25% between 1982 and 1985 (using the "moderate trend" scenario in their model). The growth of supervisors of blue collar workers during this same time-period is projected to be 27%; the growth of supervisors of service workers is projected to grow 33%.

TABLE 8

OCCUPATIONAL EMPLOYMENT PROJECTIONS FOR SUPERVISORS TO 1995*
(NATIONAL)

Occupation	Employment** 1982	Employment** 1995	Percent Change 1982-95
TOTAL, ALL OCCUPATIONS...	101,510	127,110	25%
Supervisors.....	1,443	1,829	27%
Of Blue-Collar Workers.	1,200	1,519	27%
Of Service Workers.....	210	279	33%

7. EMPLOYMENT PROJECTIONS FOR ELECTRICAL AND ELECTRONICS TECHNICIANS AND COMPUTER SPECIALISTS THROUGH 1995* (NATIONAL)

Based on the same publication described above, the projections for electrical/electronics technicians are very impressive with growth expected to be more than twice the rate of all occupations.

TABLE 9

OCCUPATIONAL EMPLOYMENT PROJECTIONS*
FOR ELECTRICAL/ELECTRONICS TECHNICIANS AND COMPUTER SPECIALISTS
THROUGH 1995 (NATIONAL)

Occupation	Employment** 1982	Employment** 1995	Percent Change 1982-95
Total, All Occupations	101,510	127,110	25%
Electrical/Electronics Technicians	366	589	61%
Computer Specialists			
Programmers	266	471	77%
Systems Analysts	254	471	85%

Extracted from MONTHLY LABOR REVIEW, November 1983, Occupational Employment Projections to 1995, U. S. Department of Labor, Bureau of Labor Statistics, Washington, D.C. 20212.

***In 1,000's.*

NOTE: The educational level of the work force is gradually rising. For example in 1952, the average worker had 11.1 years of schooling--by 1980, the average reached 12.7 years. Likewise, in 1952 about 8% of the work force had 4 or more years of college: by 1980, this had reached 19%.

NOTE: The Targeted Industries Program of the Indiana Department of Commerce is an effort to focus the state's economic development resources to achieve the most effective return on our efforts. A comprehensive selection/prioritization process which was carried out to identify a "targeted" industry for Indiana's economic development efforts. The industry selected was communications and electronics (Standard Industrial Classification 366 and 367). The report mentioned that "top flight" personnel is a necessity and a major asset for firms in this industry.
Reference: Targeted Industries Program. Indiana Department of Commerce, Lt. Gov. John M. Mutz, Director. April, 1982.

F. QUALITY CONTROL (Q.C.) SPECIALISTS

A. Descriptions

Quality control and reliability assurance in industry are critical functions. They are important in efforts to increase productivity and to gain market advantage. Much needs to be done to apply and advance related technology and science throughout American industry. Essentially, there are two levels of specialized personnel in this field, they are "Certified Quality Engineer," and "Certified Quality Control Technician." Panels of U.S., Japanese and Great Britain experts are in agreement that more advanced systems of quality control will be implemented. *(Source: CAD/CAM International Delphi Forecast, (Dearborn, Michigan: Society of Manufacturing Engineers, 1980).*

B. Needs for Q.C. Specialists

As stated earlier in this report, there are about 13,000 employees in manufacturing firms in Region 10. The size and nature of this industrial division warrants the establishment of instructional programs in Q.C.; the need to do so was confirmed in a meeting with representatives of key manufacturing firms in Bedford/Bloomington on 23 August, 1984.

C. Instructional Programs for Q.C. Specialists

Examples of typical instructional topics, developed from guidelines of the American Society for Quality Control, are presented below. These programs should be worked out with the assistance of professional Q.C. personnel in local firms.

Certified Quality Control Engineer*

1. Quality Management
   Areas include: quality control systems, quality costs, quality planning, quality improvements, quality information systems, motivation and human factors, reliability
2. Metrology Inspection and Testing
   Areas include: non-destructive testing
3. Statistical Quality Control
   Areas include: process capability studies
4. Probability
   Areas include: descriptive analysis
5. Correlation and Regression Analyses
6. Analyses of Variance and Experimental Design (ANOVA)

Certified Quality Technician**

1. College Algebra
2. Statistical Quality Control
3. Metrology Inspection and Testing
4. Quality Control & Management

This series of courses taken by a practicing engineer or an adult employee who has acquired the technical proficiency equivalent.

***A certificate of completion could be awarded to those completing these courses.*

NOTE: The above Q.C. specialists are certified by the American Society for Quality control (not a license--but certification by peers). Besides passing examinations, candidates must meet certain experience and other qualifications.

9. THE INDIANA COMMISSION FOR HIGHER EDUCATION STUDY OF POST-HIGH SCHOOL EDUCATIONAL NEEDS AND OPPORTUNITIES IN SOUTHERN INDIANA*

The Commission conducts reviews of regional needs as part of the process of updating its statewide plan and advising the General Assembly and the Governor on higher education needs and priorities. The following are extracts from the Commission's study* for Southern Indiana.

"FINDING 1. A Tradition of Community Support:
...In recent times, substantial community support has been rallied in an effort to obtain additional higher education opportunities.... Most recently groups have been formed in Ripley County,...for this same purpose.... (These communities) share the goal of expanding access to higher education for their fellow citizens.

"FINDING 8: Limited Availability of Selected Programs
As institutions develop and community needs for instruction emerge, it is expected that academic degree programs will be proposed...

Source: Executive Summary, Adopted by the Indiana Commission for Higher Education, November 11, 1983.

Except for two long-standing Host-Guest programs at IU-Southeast and limited offerings in agriculture at Vincennes, there are no undergraduate Purdue degree programs available in the southern region. Further, there is even some evidence that hosting Purdue programs is viewed with caution by some campus administrators. Administrators at both IU-Southeast and ISU-Evansville have stated that they are not anxious at the current time to have Purdue programs on their campus. In the case of IU-Southeast, the campus preference is to have an expanded mission which would include the offering of campus-based technology programs. Students and employers in other parts of the State have shown strong support for Purdue programs. For example, 34.1% of IUPUI undergraduate students enroll in Purdue programs; at Fort Wayne, Purdue program students account for 40.5% of undergraduate enrollments. The Purdue-Calumet campus has grown by 15% since 1975 and PU-North Central grew by 42.1% in the same period.

"FINDING 13. Rural Counties and College Participation

Twenty-eight of the thirty-six counties in the southern region have a lower adult college participation rate in higher education than the state average for all counties of 6.4%.... (Extracts from Table below show data for Indiana counties in Region 10.)

TABLE VII (EXTRACTS FROM ICHE REPORT)
RESIDENTS' ANNUAL PARTICIPATION IN POSTSECONDARY EDUCATION
(1981-82) IN INDIANA INSTITUTIONS
(SELECTED COUNTIES IN S.E. REGION)

County	Total Number of Participants	Approximate County Participation Rate
Greene	1,030	3.8%
Lawrence	1,331	3.1%
Monroe	9,356	9.5%*
Owen	443	2.7%
Indiana Residents Statewide	267,139	4.9%

*Location of Indiana University.

Source: Indiana Commission for Higher Education (ICHE) Annual Report 1982 and Indiana Fact Book, 1979, p. 21.

"FINDING 14. Postsecondary Education Participation Rates

The relatively low rates of postsecondary education participation among Hoosiers is of continuing concern to many groups including state leaders. Several factors are likely to influence postsecondary education participation rates including the proportion of the adult population who are between 16 and 24 and the

proportion of the population who have graduated from high school. Counties with larger proportions of adults who are between the ages of 16 and 24 and those having a higher proportion of high school graduates are more likely to have higher postsecondary education participation rates. In addition, small population clusters discourage institutions from offering programs because student demand is low. The southern region has an above average percent of its adult population in the 16 to 24 age group; both the southern and west-central regions are .4% above the state's average of 17.3%. The southern region has the lowest rate of the four Commission regions with respect to the percentage of the population who are high school graduates.

A third factor related to participation in postsecondary education is the urban nature of the county. Even when the two factors of proportion of the population between 16 and 24 and the proportion who are high school graduates are controlled for, there remains a positive relationship between the extent to which a county is urban (% of population living in communities larger than 2,500) and the postsecondary education participation rate. (Data) show that urban counties tend to have higher participation rates, after controlling for the proportion of the population who are between 16 and 24 and who have graduated from high school. Thus, it is likely that the rural nature of the southern region works to the detriment of the college-going pattern of its residents.

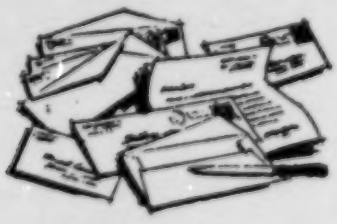
"FINDING 15: <u>In-State College Migration Patterns of Students from Southern Indiana</u>"

Postsecondary students from the southern region remaining in Indiana for their college or university education attend public institutions in the same proportion as the average for all Hoosiers remaining in the state (87%). Only 13% of the southern Indiana students attending public institutions in the state leave the region. Very few students from the southern region attend independent colleges outside the region."

(End of ICHE Report Extracts)

10. <u>LOCAL LETTERS OF SUPPORT</u>

The efforts to identify postsecondary technology educational programs needed and wanted in Region 10 and efforts take action for their implementation has resulted in numerous expressions of interest and support. A number of letters from representatives from this region are attached as appendices to this report.



II. CONCLUSIONS AND RECOMMENDATIONS

A. Summary and Conclusions

1. Population*

The population of Region 10 was 187,600 in 1980, and is projected to grow to 209,200 by the year 2000. This is an 11.5% increase, well above the projected State growth of 6.7%. The largest county is Monroe, which will soon have 100,000 people; the second largest is Lawrence with nearly 45,000 people. A decrease in the numbers of college-entry age group (15 thru 19) is expected in this region; however, an increase is projected for those 25 years of age and older, especially for those 35 years of age and older. (The total in- and out-migration in this region balances for no appreciable net change.) One should conclude that this is a viable region of about 200,000 people, with a growing proportion of working-age adults, particularly those between 35 and 54 years of age.

2. Educational Attainment

The proportion of adults (25 years and older) in Region 10 who have a bachelor's or higher degree is higher for Monroe County (home of Indiana University) than the regional or national averages. However, all the other counties in this region have postsecondary educational attainment levels well below the state and national averages. The conclusion is that much needs to be done to raise the postsecondary educational level of adults in Greene, Lawrence and Owen Counties in order to reach state or national averages.

**For more population and educational level details, see Office of Manpower Studies report "Indiana and Region 10 Counties Population Projections to the Year 2000, by Age and Sex; and Adult Education Attainment Levels," dated 10 November 1983.*

3. Choice of Attending a Postsecondary Institution

Survey data show that the reasons identified most often in choosing a postsecondary institution are: First, Offers what I want to study; Second, Program is available locally; Third, Academic quality is high; and Fourth, Tuition is relatively low. It follows then, that there is a necessity to identify the programs/courses that are needed and desired, to offer them locally, maintain high academic standards, and keep costs reasonable.

4. WorkForce in Region 10

More than 54,000 people are employed in Region 10. Nearly 19,000 employees work in the Personal Services groups, and nearly 13,000 are working in the major industrial division of Manufacturing. The largest manufacturing group (employing more than 5,000 people) is electrical and electronic equipment and machinery; nearly all of these employees work in Monroe County, (in fact, the majority of the total Region 10 work force is employed in Monroe County). Selected employment highlights for the region and for Monroe and Lawrence Counties are shown in Table 10.

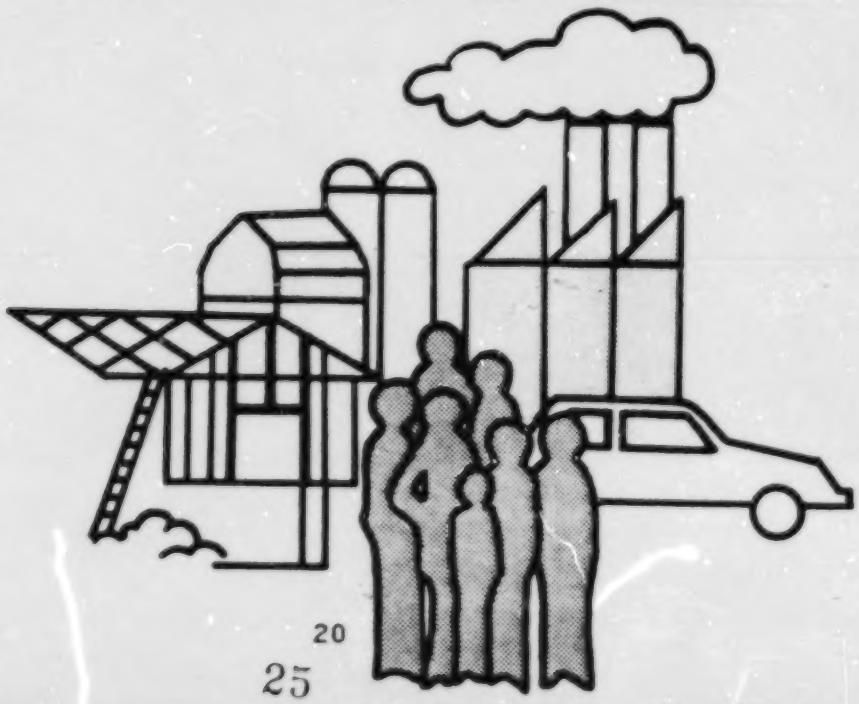


TABLE 10
EMPLOYMENT HIGHLIGHTS FOR REGION 10 IN SELECTED INDUSTRIES AND MONROE AND LAWRENCE COUNTIES

MAJOR DIVISION AND GROUP*	TOTAL REGION 10 EMPLOYMENT	EMPLOYMENT IN MONROE COUNTY	EMPLOYMENT IN LAWRENCE COUNTY
Manufacturing	12,848	7,979	3,931
Electrical/Electronic	5,424	5,044	30
Stone, Clay, Glass & Concrete Products	1,542	872	643
Primary Metals Indus.	1,309	69	1,240
Transportation Equip.	1,081	8	1,073
Instrumentation	600	600	0
Service Industries			
Personal Services**	18,958	10,311	3,492
Wholesale & Retail Trade	12,919	7,026	2,379

**Includes only selected industries. See Table 5 for more detail.*
***Includes Business, Education, Health, Motels, and Social Services.*

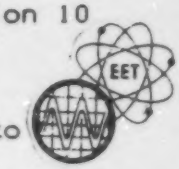
The employment and training requirements data in Tables 6 and 7 indicate that from a quantitative technology-related manpower point of view, the larger employment concentrations are found in Monroe County. From a qualitative point of view (e.g., higher level of technical qualifications and/or rapid growth and rate of changes), attention should be directed to occupations connected with electronics, computers, and modernization of manufacturing and service industries.

5. Technical and Supervision Training Requirements in Region 10 and Selected Counties:

An analysis of the employment data indicate a current priority need exists for the following two Associate Degree technology programs: (1) Electrical Engineering Technology and (2) Supervision (e.g., first-line supervisors/foremen). Future needs which are developing include (1) a Computer Technology (business programmer/ analyst) Program, and (2) a Computer Integrated

Manufacturing Technology/Mechanical Engineering Technology Program. Conclusions pertaining to each program follow:

a. A computed requirement exists for the training of approximately 45 electrical/electronic technicians each year to meet Region 10 needs. At least 25 of these technicians are needed as new entrants into the labor force; and there is a requirement to upgrade or retrain at least 20 adults now in the work force. More than 75% of these electronics technician requirements are found in Monroe County (Bloomington). U. S. Department of Labor, Bureau of Labor Statistics data show this to be one of the fastest growing occupations in employment projections to 1995.



b. There is also a need for the upgrade and retraining of first-line supervisors, as well as to prepare new entrants into beginning supervision positions. This can be done through the technology Supervision program. The total training needs in Supervision are about 100 per year. Nearly two thirds of this total need are in Monroe County, with the majority of the remaining third in Lawrence County (Bedford).

c. There is an annual recurring need for 16 new computer business programmers and the need to upgrade or retrain 17 more, totaling 33 Computer Programmer/Analysts. The requirements are increasing steadily for higher level, college trained specialists to enter this field, and a need to continuously upgrade skills and knowledge of adults now in the work force.

d. Finally, an emerging need is for Computer Integrated Manufacturing Technology/Mechanical Engineering Technology (CIMT/MET) Technicians. Current needs have been identified for about 13 new hirees and upgrade training for adults now in

the local workforce in this new program. Trends show a growing need over time.

(This program, designed to provide technicians who can function effectively in a modern manufacturing plant, has just been started on Purdue West Lafayette campus.) This CIMT/MET program can, through the assistance of a local manufacturing advisory committee help meet the annual recurring needs for a portion of the mechanical and industrial engineering technicians, as well as modern draftsmen and numerical control machine programmers.

6. Accreditation of Engineering Technology Programs

The mark of excellence for these programs is accreditation by the Accreditation Board for Engineering and Technology. The meeting and maintenance of professionally established standards and criteria are thusly assured.

7. Quality Control (Q.C.) Specialists

The situation in American manufacturing industry, and the size and nature of the industrial firms in Region 10, substantiate the requirement for the training of statistical process Q.C. specialists. These include specialized courses for engineers and/or technically proficient personnel to be prepared as Certified Quality Control Engineers, and for preparing Certified Q.C. Technicians. Both can be readied for the examination given by the American Society for Quality Control. A certificate of completion of the course work could be awarded by Purdue University. These programs should be planned with the assistance of professional Q.C. personnel in local firms.

8. Adult Continuing Education

The offering of appropriate educational courses and programs for adults is becoming more important. The significant shift in population to a smaller proportion of young people and a much larger proportion of middle-aged workers, and the relatively low level of educational attainment of adults are evidences of the need to concentrate in this area. It is concluded that courses and programs desired by adults which are pertinent to help develop their skills and qualifications should be identified and offered locally. Programs must be academically sound and provided at reasonable rates. Counseling and other student services, and remedial academic work must also be provided. The support of local firms and actions to inform and motivate employees to participate, provide tuition assistance, and recognize their progress is necessary. Procedures and instruction should accommodate both full-time and part-time students and be available during evening and night-time hours as well as during the day.

9. Local Advisory Committee

Experience has shown that technical programs designed to meet defined needs are helped considerably through the assistance of local advisory committees. Membership on such committees is made up of representatives from appropriate industries or organizations who have expertise in the specialized field of study and are desirous of helping. The input of such committees begins with the early planning stage, continues through implementation, recruitment of students, provision of support, evaluation, and recommendations for improvement. This committee can also participate in long-range planning efforts.

10. The Indiana Commission for Higher Education Report

The Commission, in its recent study of higher education in the Southern Region of the State reported among other things:

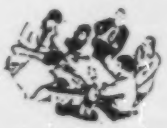
- There has been a tradition of community support...however,
- There is limited availability of selected programs,
- There is a relatively low rate of residents' participation in postsecondary programs,
- There is continuing concern among state leaders and Hoosiers because of the low rates of postsecondary education participation,
- Relatively few of the southern Indiana students who do attend local public institutions leave the region.

Referring to this ICHE Report can be helpful in gaining approvals and resources for program implementation.

B. Recommendations

1. Authorization to Implement the Electrical Engineering Technology (EET) Associate Degree Program

It is recommended that agreement be reached with Indiana University officials, and approval be requested for authorization to offer the EET two-year Associate Degree program in order to meet Region 10 electrical/electronics technician requirements. Necessary procedures should be established to assure that program goals, and the quality of instruction and facilities meet Purdue University's Department of EET standards as well as those of the national Accreditation Board for Engineering and Technology. Due to the urgent needs for this technical training, priority action is indicated.



2. Authorization to Implement the Supervision Associate Degree Program

It is recommended that agreement be reached with Indiana University officials, and approval be requested for authorization to offer the Supervision two-year Associate Degree program in Region 10. Classes could be offered wherever sufficient numbers of students indicate interest in a given course (e.g., Bloomington, Bedford, etc.).

3. Computer Technology Program Implementation

Authorization to implement the 2-year computer technology program for the training of new business programmer/analysts and the upgrade and retraining of adults now in the workforce should be requested. This program should be designed to support modern business processes. Agreement should be reached with Indiana University officials for the planning and implementation of this program.

4. Follow-on Programs

After agreements, approvals and resources for implementation for the above are obtained, it is recommended that the needs be reexamined for the two-year program in Computer Integrated Manufacturing/Mechanical Engineering Technology Program. Also, after sufficient numbers of students have graduated from the two-year Electronics Engineering Technology, Computer Technology and/or Supervision programs, a manpower study should ascertain whether or not the additional two years for the respective baccalaureate programs should be offered. Meanwhile, those students completing two-year programs can continue their studies at IUPUI, or Purdue's West Lafayette, Fort Wayne or Hammond/Calumet campuses.

5. Quality Control Specialists

It is recommended that courses be offered to prepare or upgrade statistical process/quality control specialists in the manufacturing firms of Region 10. These courses could result in the award of a Certificate of Completion: students should be prepared for the examinations by the American Society for Quality Control. Courses should be designed for practicing engineers (or those with equivalent technical proficiency) to qualify as Certified Quality Control Engineers and for technicians to qualify as Certified Quality Technicians.

6. Adult Continuing Education and Service Courses

It is recommended that plans and actions be taken to meet the technical educational and related support services needs of <u>working adults</u> in Region 10, primarily in the cities of Bloomington and Bedford. Special recruitment, counseling, evaluation, remedial

academic work, and other activities will undoubtedly be required. Provisions should include providing remedial academic work in mathematics, English, and/or participating in workshops or seminars. It is also recommended that class instruction and necessary student support services be provided for both part-time and full-time students and during evening as well as daylight hours.

7. Indiana Commission for Higher Education Report Statements

It is recommended that the fact that the Indiana Commission for Higher Education has pointed up the limited availability of postsecondary educational programs in this region be used in the furtherance of planning, in gaining approvals and resources and in implementation of related actions.

8. Technology Advisory Committees

An industrial/educational advisory committee should be organized for each major program, made up of representatives selected from appropriate local industries. Major activities of these committees should include:

(a) Student recruitment, selection and counseling,

(b) Instructional program matters,

(c) Teacher assistance,

(d) Awards and public relations,

(e) Resource acquisition,

(f) Maintaining liaison with other industry representatives and

(g) Study of future plans and training needs.

9. Liaison and Coordination

It is recommended that close liaison and coordination be established early and maintained between all parties concerned, including Indiana University officials and the Purdue University department head of Electrical Engineering Technology, department head of computer technology, department head of Supervision, and the directors of the Statewide Technology Program and Office of Manpower Studies.

ATTACHMENT I

BRIEF DESCRIPTION OF
(TWO-YEAR) ASSOCIATE IN APPLIED SCIENCE (AAS) DEGREE
TYPICAL REGIONAL CAMPUS
ELECTRICAL ENGINEERING TECHNOLOGY PROGRAM

The Electrical Engineering Technology Program is a combination of courses in electricity, electronics, mathematics, science, and general academic areas that leads to the A.A.S. degree. The program is designed to prepare students for employment as technicians in research laboratories, electronic industries, and in manufacturing and other industries that use electrical power or electronic controls. Courses may also be taken by adults now in the workforce.

The basic curriculum provides the student with education related to the fields of communications electronics, industrial electronics, microwaves, military electronics, computer electronics, automation, industrial controls, electronic servicing, television, electrical power, aviation electronics, and others. Specialization in these areas may be provided by technical elective courses in the second year of the program. A considerable amount of laboratory work is required.

Students who qualify for the A.A.S. degree are eligible for consideration for admission to curricula leading to the B.S. degree. Approximately two additional years of study are necessary to complete the requirements for the baccalaureate degree.

Graduates of the associate degree program in electrical engineering technology are eligible for certification as associate engineering technicians, and they are qualified to take the exam for FCC licensure.

Credit Hours Required for Associate Degree: 67 — Typical Curriculum

Freshman Year

First Semester (18 Semester Hrs.)	Second Semester (16 Semester Hrs.)
Electrical Circuits	Electrical Circuits
Digital Fundamentals	Electronics
Algebra & Trigonometry	Digital Fundamentals
Elementary Composition	Calculus
Computer Programming	Electrical & Electronic Drafting

Sophomore Year

Third Semester (15 Semester Hrs.)	Fourth Semester (16 Semester Hrs.)
Electrical Circuits	Electric Machinery
Electronics	Introduction to Microprocessors
Calculus	Technical Elective
General Physics	Speech Communications
	Non-technical Elective

ATTACHMENT II

DESCRIPTION OF 2 YEAR ASSOCIATE IN APPLIED SCIENCE (AAS) DEGREE PROGRAM IN SUPERVISION

Supervision, Associate in Applied Science Degree
(Two Year Program)

This program is designed to meet the needs of people who wish to improve themselves educationally and professionally through the development of basic superisory skills. The program is designed for students who are employed or who have had previous experience in the workforce. Students may attend on a full-time or part-time basis. Persons who are already in supervisory positions as well as those who desire to equip themselves for upward mobility into supervisory levels are encouraged to enroll in this program.

Students plan a strong individualistic program around their own career goals taking courses equipping them for the technical or specialized aspects field of endeavor. Graduates of the A.A.S. program are eligible to continue toward a B.S. degree in supervision Credits earned in the A.A.S. can apply to the B.S.

A total of 63 semester credit hours is required to earn the associate degree. The program is made up of three parts: (1) A core of eight courses, totalling 24 credit hours. Every student is required to complete all of these courses. (2) A Specialized Functional Area, pertinent to each student's career goals is identified. Each student must complete at least 15 credit hours in the area selected. (3) Each student also completes 24 credit hours in a Supportive Area. A short description of these three parts, as presented on the Purdue West Lafayette Campus follows:

1. Each student must take or test out of eight core courses, made up as follows:

CORE (24 Credit Hours)

Sem. Hrs.	
3	Human Relations in Supervision
3	Occupational Safety and Health
3	Elements of Supervision
3	Training for Supervisors
3	Industrial Organization or
3	Elements of Production Management
3	English Composition
3	Fundamentals of Speech Communication
3	Algebra and Trigonometry I.

(continued on next page)

2. Each student must select courses in a Specialized or Technical Functional Area and earn at least 15 semester hours in related courses. These courses provide the student with 15 hours of technical skills and knowledge basic to his/her career choice. The Purdue program counselor must approve the courses prior to taking them. Flexibility is provided to ensure an individualized program.

Examples of typical Technical or Specialized Areas
(15 Credit Hours)

Accounting
Manufacturing Technology
Construction
Electrical Technology
Health Care
Hospitality
Labor Relations
Marketing
Materials Handling
Mechanical Technology
Office Operations and Automation
Personnel
Production Planning
Quality Control
Retailing
Technical Graphics
Work Methods

3. Each student must also take 24 credit hours from Supportive courses as shown below:

Supportive Area (24 Credit Hours: see division below)
15 Credit Hours must be from the following courses:

3 Algebra and Trigonometry II
3 General Chemistry or other Chem course
3 Physics
3 Introduction to Computers
3 Basic or Fortran Computer Course
3 Statistics for Technology
3 Introductory Accounting
3 Cost Accounting or
Monetary Analysis for Industrial Decisions
3 Technology Graphics
3 Work Methods and Measurement
3 Principles of Economics
3 Supervision and Personnel Problems
3 Labor Relations
(Will also accept certain other courses with program counselor's approval.)

9 Credit Hours may be selected with program counselor's approval from other disciplines such as Psychology, Sociology, English, or additional Technical/Sciences/ Engineering courses.

NOTE: Some supervisors may desire to take only selected courses--perhaps at night, as part-time student. Arrangements can usually be made to meet their needs providing a sufficient number desire the course, and any course pre-requisites (if any) are met. The Purdue program counselors must approve the course in each such instance.

ATTACHMENT III

BRIEF DESCRIPTION OF (TWO-YEAR) ASSOCIATE IN APPLIED SCIENCE (AAS) DEGREE

COMPUTER TECHNOLOGY

The Computer Technology Program is a combination of courses in computing, mathematics, communications, and management that leads to the A.A.S. degree. The program is designed to prepare business applications programmers for employment in companies that use computing to support their business activities.

The curriculum prepares a graduate who:

1. Creates computer programs to solve business problems, including correcting program errors, revising to meet changing requirements and documenting to record the procedures to be followed
2. Understands the goals, functions, and operations of business organizations
3. Understands information needs and the role of information systems in business organizations
4. Understands computer hardware and software systems organization and operations
5. Possesses communications and human relations skills for effective interaction with others, especially the users and developers of information systems.

The curriculum conforms to the model curriculum for computer information systems endorsed by the Data Processing Management Association.

Students who qualify for the A.A.S. degree are eligible for consideration for admission to the Bachelor of Science (BS) degree program. At least two additional years of study are necessary to earn the BS degree.

Credit hours required for AAS degree: 62

Freshman Year

First semester (17 credits)
Computers & Programming I
Introduction to Computer-based Systems
Algebra and Trigonometry
English Composition I
Fundamentals of Speech

Second semester (15 credits)
Computers & Programming II
Hardware/Software Fundamentals
Introductory Analysis I
English Composition II
Principles of Economics

Sophomore Year

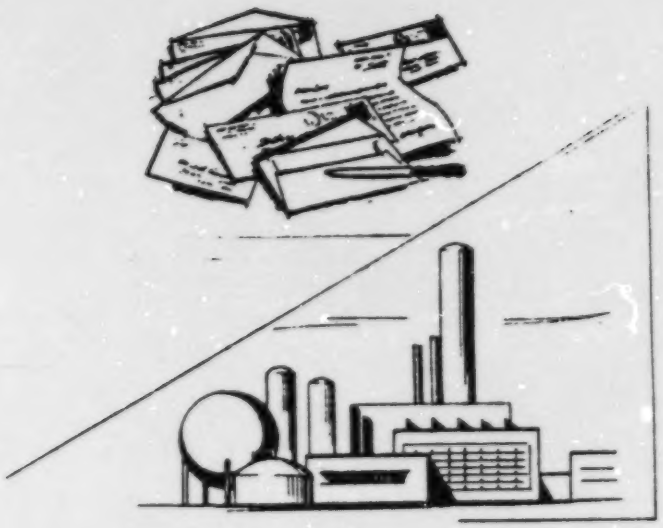
Third semester (15 credits)
COBOL Programming
Computer Operating Systems
Introductory Accounting
Free elective
Introductory Analysis II

Fourth semester (15 credits)
Systems analysis & design
Topics in COBOL
Management Accounting I
Computing/business elective
Computer-based Business Statistics

APPENDICES

LETTERS OF SUPPORT

1.	BFGoodrich Company	Bloomington
2.	Ford Motor Company/Electronics and Refrigeration Corporation	Bedford
3.	RCA/Consumer Electronics	Bloomington
4.	Stone City Products, Inc.	Bedford
5.	Westinghouse Electric Corporation	Bloomington



BFGoodrich

The BFGoodrich Company
Off-Highway Braking Systems Division
1031 E. Hillside Drive
Bloomington, Indiana 47401
812-336-3811
Telex 4995418

August 27, 1984

Dr. J. P. Lisack
Office of Manpower Studies
School of Technology
Purdue University
West Lafayette, IN 47907

Dear Dr. Lisack,

We have reviewed your Technology Programs and are enthusiastic about the possibility of these programs being offered in our area.

We predict that many BFGoodrich employees will enroll and take advantage of this local offering from such a well respected school as Purdue University. We have reviewed each curriculum outlined in your study and find the courses listed to be very comprehensive and well related to our business and technology. From what we see we will possibly utilize specific courses as training vehicles for our key supervision and management employees.

If you have any questions or comments, please feel free to contact me.

Sincerely yours,

Joe Moore

J. C. Moore
General Manager,
North American Operations

bp

Ford Electronics and
Refrigeration Corporation
Electronics Division

3120 W. 16th Street
Bedford, Indiana 47421

September 5, 1984

Dr. Don K. Gentry, Director
Purdue Statewide Technology
School of Technology
Purdue University
West Lafayette, Indiana 47907

Dear Dr. Gentry:

In response to your request we support your endeavor to bring Purdue University Technology Programs to the Bedford area. In order for us to compete effectively in an International Market we must provide recent high school graduates and employes with high quality Technical Programs.

The Bedford Plant's manufacturing processes has changed dramatically and requires additional training for first line supervisors, technicians, engineers and service maintenance employes. In the last three years we have moved from 1950 technology to the state of the art micro processor controlled manufacturing equipment.

In closing it must be stated, that for our competitive survival Purdue University Technology Programs will offer an important catalyst for our success.

Sincerely,

George D. Pemberton

George D. Pemberton
Salaried Personnel and Training
Ford Electronics and
Refrigeration Corporation

cc: Mr. Al Walker
Manager
Bedford Chamber of Commerce

RCA | Consumer Electronics
1300 S Rogers St | PO Box 969 | Bloomington, IN 47402

Dr. J.P. Lisack, Director
Office of Manpower Studies
School of Technology
Purdue University
West Lafayette, Indiana 47907

RCA

Dear Dr. Lisack: September 17, 1984

As we discussed at the August meeting, your study indicates what we at RCA have known for many years: there is a need for quality engineering education in the Bloomington area.

Currently, RCA Bloomington employs 158 hourly and 73 salary employees in technical occupations that require the electrical/electronic knowledge that your programs would provide. In the past, we have had to go outside the Bloomington area in order to locate qualified candidates to fill openings for some of these positions. Your programs could also be a viable resource to compliment our in-plant technical training for these technical occupations.

We also feel that because many of our 91 first-line supervisors are non-degreed, your "Associate in Applied Science Degree in Supervision" would offer them a program that could benefit them on their jobs and for possible future opportunities.

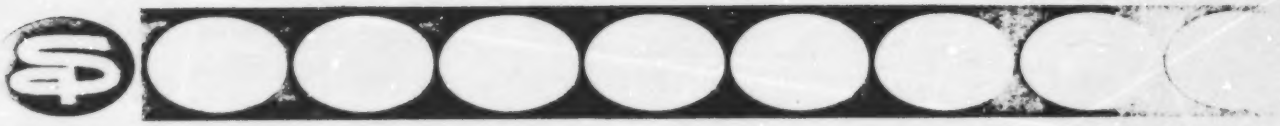
In summary, RCA Bloomington (Plant Manager, Bob Arnett, and the Training Department) is supportive in your efforts to implement the Purdue Technology Programs in the Bloomington/Bedford area. If there is anything that we can do to assist you in the implementation of these programs in this area, please call me at 812-334-5298.

Very truly yours,

M. E. Nuckles, Administrator
Compensation, Training, and Organization Development

bw

Stone City Products, Inc.
P.O. Box 369 • 1206 Seventh Street
Bedford, Indiana 47421
Phone: 812-275-3373
TWX: 810-350-0321



Electronic Hardware
Housewares
Stampings
Assemblies

August 28, 1984

Dr, J. P. Lisack, Director
Office of Manpower Studies
Purdue University, SCC-A
West Lafayette, IN 47907

Dear Dr. Lisack:

I wish to thank you and Dr. Gentry for your presentation of possible Purdue technology programs in the Bloomington/Bedford area. The need for high quality technical education is very great in this area. The closest school to Bedford is IUPUI, a 75 mile drive one way.

In reviewing your manpower study, I feel there is a great need for electrical engineering technology and supervision programs in the Region 10 area. In addition I feel there are some other areas of education that need to be addressed.

1. Statistical Process Quality Control: The future of competitive U. S. manufacturing lies with SPC programs and should be developed both for the quality engineer and less technical courses for the line worker.

2. My company, as a metal stamper, would greatly benefit from a mechanical engineering technology program.

3. Even though we have the Indiana University School of Business 30 miles from Bedford, there is a need for industrial management education. I have personally taken courses at both the I.U. School of Business and the Krannert School of Industrial Administration and believe that the I.U. School of Business is not geared to handle people who want management training in manufacturing. This is a serious need in this region.

Technical education in this area of Indiana is long overdue. It would help existing business expand and help attract new business to the area.

If I may be of help in causing this proposal to become a reality do not hesitate to call upon me.

Very truly yours,

STONE CITY PRODUCTS, INC.

Stewart Rariden/jm

Stewart Rariden
Vice President

SR:jm

Westinghouse
Electric Corporation

Transmission & Distribution
Components Division

Box 341
Bloomington Indiana 47402
(812) 332 4421

September 6, 1984

Dr. J. P. Lisack, Director
Office of Manpower Studies
School of Technology
Purdue University
West Lafayette, IN. 47907

Dear Dr. Lisack:

Thanks for the opportunity to review the "Manpower Study Assessing The Need for Purdue Technology Programs in the Bedford/Bloomington Indiana area and Region 10."

Our Engineering people have reviewed the contents of the EET program and feel it would meet our needs here at Westinghouse. They felt that you are on target with your program and that we need such a program in our area. We in management are in full agreement with their assessment.

If we can be of further assistance to you in establishing this program, feel free to contact me.

Sincerely,

Robert A. Dyer, Supervisor
Human Resources